NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

PEST MANAGEMENT

(Acre)

CODE 595

DEFINITION

Utilizing environmentally sensitive prevention, avoidance, monitoring, and suppression strategies to manage weeds, insects, diseases, animals, and other organisms (including invasive and noninvasive species) that directly or indirectly cause damage or annoyance.

PURPOSE

This practice is applied as part of a resource management system to support one or more of the following purposes:

- Enhance quantity and quality of commodities.
- Minimize negative impacts of pest control on soil, water, air, plant, animal, and/or human resources.

CONDITIONS WHERE PRACTICE APPLIES

Wherever pests will be managed.

CRITERIA

General Criteria Applicable to All Purposes

A pest management plan shall be developed as a component of a conservation plan. All methods of pest management must comply with Federal, State, and local regulations, including management plans for invasive pest species, noxious weeds, and disease vectors. Compliance with the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Tennessee Insecticide, Fungicide, and Rodenticide Act (TIFRA); Food Quality Protection Act (FQPA); and Worker Protection Standard (WPS). [For information concerning regulations and certification, see Tennessee Department of Agriculture (TDA) or University of Tennessee Agricultural Extension Service (UTAES).]

Pesticides classified as "restricted use" can only be purchased and applied by certified applicators, who maintain a license and certification with the Tennessee Department of Agriculture (TDA).

Integrated Pest Management (IPM) that strives to balance economics, efficacy, and environmental risk, where available and economically feasible, shall be incorporated into planning alternatives. IPM is a sustainable approach to pest control that combines the use of prevention, avoidance, monitoring, and suppression strategies to maintain pest populations below economically damaging levels to minimize pest resistance, and to minimize harmful effects of pest control on human health and environmental resources. IPM suppression systems include biological and cultural controls and the judicious use of chemical controls. (For further guidance, see UTAES publications for commodity specific IPM,

e.g., *Cotton Insect Control Guide, PB-387.)*

All methods of pest management must be integrated with other components of the conservation plan.

Clients shall be instructed to pay special attention to all environmental hazards and site-specific application criteria listed on pesticide labels and contained in UTAES and Crop Consultant recommendations.

Additional Criteria to Protect Quantity and Quality of Commodities

As an essential component of both commodity-specific IPM and IPM general principles, clients shall be encouraged to use the minimum level of pest control necessary to meet their objectives for commodity quantity and quality.

Additional Criteria to Protect Soil Resources

In conjunction with other conservation practices, the number, sequence, and timing of tillage operations shall be managed to maintain soil quality and soil loss at or below the soil loss tolerance (T) predicted or another planned soil loss objective.

Current erosion prediction tools such as RUSLE2, WEQ, or similar ones will be used to monitor soil erosion. Rating procedures such as the Soil Conditioning Index (SCI) and/or Soil Tillage Intensity Rating (STIR) will be used when appropriate to monitor soil quality.

Pesticide label instructions will be followed to limit pesticide residues in soil that may negatively impact non-target plants, animals, and humans.

Additional Criteria to Protect Water Resources

Pest management environmental risks, including the impacts of pesticides in ground and surface water on humans and non-target plants and animals, must be evaluated for all identified water resource concerns. Environmental risks will be determined by using NRCS' Windows Pesticide Screening Tool (WIN-PST) in Tennessee. The WIN-PST program can be obtained at the following USDA web site: http://www.wsi.nrcs.usda.gov/products/W2Q/pest/winpst.html

When a chosen alternative has significant potential to negatively impact important water resources (e.g., WIN-PST "Extra High," "High," or "Intermediate" soil/pesticide human risk ratings in the drainage area of a drinking water reservoir), an appropriate set of mitigation techniques must be put in place to address risks to humans and non-target plants and animals.

To determine the WIN-PST toxicity rating for commonly used chemicals, see *WIN-PST Toxicity Rating of Commonly Used Chemicals in Tennessee* in Section I E-FOTG or obtain chemical toxicity rating in WIN-PST).

Pesticides identified as having a **Low or Very Low toxicity rating do not require** any additional action as long as they are used according to the label and meet e-FOTG resource quality criteria (refer to Section III of e-FOTG, "Guidance Documents and Quality Criteria."

Pesticides identified as having an **Intermediate, High, and Extra High toxicity rating** that are planned for application to fields **will require a WIN-**

PST Soil/Pesticide Interaction Report. The WIN-PST Soil/Pesticide Interaction Report will evaluate and estimate loss potential (leaching, solution runoff, and absorbed runoff) and hazard ratings for soils and pesticides.

WIN-PST Soil/pesticide interaction reports with **Hazard Ratings** of **Low or Very Low do not require** any additional action as long as they are used according to the label and meet e-FOTG resource quality criteria (refer to Section III of e-FOTG, "Guidance Documents and Quality Criteria."

WIN-PST Soil/pesticide interaction reports with **Hazard Ratings** of **Intermediate, High, or Extra High will require that an appropriate set of mitigation techniques** be planned and applied. Select appropriate mitigating practices from ***Mitigation Effectiveness Guide - Reducing Pesticide Impacts on Water Quality*** in Section I of the e-FOTG. The WIN-PST results and mitigation techniques will be documented on the ***Pest Management Worksheet* (Excel)** in Section I of the e-FOTG. (See *Mitigation Guidance Table* in Section I of the e-FOTG for guidance in interpreting the WIN-PST Soil/Pesticide Interaction Report Hazard Ratings.)

Where there is a potential to cross-connect with the public water supply system, i.e., chemical mixing tanks, a properly installed back-flow prevention device or air gap as required by the local water utility's Cross-connection Control Program shall be installed [Tennessee Code Annotated § 68-221-711 and Tennessee Department of Environment and Conservation (TDEC), Division of Water Supply Rule 1200-5-1-.17(6)].

When air gaps are used to prevent backflow, they shall be a minimum of two times the diameter of the supply line above the crest or overflow device of the watering facility. (Example: If the supply line is one inch, then the minimum air gap required is two inches above the crest of the overflow device.)

Clients shall be encouraged to pay special attention to pesticide label instructions for limiting pesticide residues in leachate and runoff that may negatively impact non-target plants, animals, and humans.

The number, sequence, and timing of tillage operations shall be managed in conjunction with other sediment control tactics and practices in order to minimize sediment losses to nearby surface water bodies.

Additional Criteria to Protect Air Resources

Clients shall be encouraged to pay special attention to pesticide label instructions for minimizing volatilization and drift that may negatively impact non-target plants, animals, and humans (see Spray Drift under Operation, Safety, and Maintenance).

Additional Criteria to Protect Plant Resources

Clients shall be encouraged to pay special attention to pesticide label instructions including those directed at:

- Preventing misdirected pest management control measures that negatively impact plants (e.g., removing pesticide residues from sprayers before moving to the next crop and properly adjusting cultivator teeth and flame burners).

- Appropriate climatic conditions, crop stage, soil moisture, pH, and organic matter in order to protect plant health. Follow the recommended label rotational intervals to avoid injury to subsequent crops in the rotation.

Additional Criteria to Protect Animal Resources

Special attention should be paid to pesticide label instructions in order to avoid injury to domestic animals, wildlife, and aquatic organisms.

Note locations of endangered and threatened species and potential impact of pesticide use (refer to county list of U.S. Fish and Wildlife Threatened and Endangered species in the Tennessee NRCS *FIELD OFFICE TECHNICAL GUIDE*, Section I). Pesticides should be adjusted accordingly to minimize impacts.

The U.T. Agricultural Extension Service publication *CORE - Applying Pesticides Correctly* - contains general recommendations on protecting non-target species, including threatened and endangered species.

Additional Criteria to Protect Humans

The label instructions as well as local, State and Federal regulations that concern posting and field re-entry restrictions on treated areas will be follow.

Planning Considerations

If commodity-specific IPM is not available, the following IPM principles should be considered:

- Prevention, such as using pest-free seeds and transplants, cleaning tillage and harvesting equipment between fields, irrigation scheduling to avoid situations conducive to disease development, etc.

- Avoidance, such as using pest resistant varieties, crop rotation, trap crops, etc.

- Monitoring, such as pest scouting, soil testing, weather forecasting, etc., to help target suppression strategies and avoid routine preventative pest control.

- Suppression, such as cultural, biological, and chemical controls that can reduce a pest population or its impacts. Chemical controls should be used judiciously in order to minimize environmental risks and pest resistance.

Adequate plant nutrients and soil moisture, including favorable pH and soil conditions, should be available to reduce plant stress, improve plant vigor, and increase the plant's overall ability to tolerate pests.

On irrigated land, irrigation water management should be designed to minimize pest management environmental risks.

Watershed analysis concerning pesticide contamination can be conducted as needed using the **National Agricultural Pesticide Risk Analysis (NAPRA)**. NAPRA evaluates the potential loss of pesticides to ground and surface waters by modeling pesticide movement, toxicity, and crop management techniques under specific

weather and soil conditions. NAPRA can be used to determine where the most critical areas are within a watershed and what kinds of alternative management strategies would be required to meet water quality goals. (For more information, go to: http://www.wsi.nrcs.usda.gov/products/W2Q/pest/napra.html

PLANS AND SPECIFICATIONS

The pest management component of a conservation plan shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

As a minimum, the pest management component of a conservation plan shall include:

1. **Aerial photo, map, or sketch.**

2. **Soil map.**

3. **Crop information** *(Client Record Worksheet will meet this requirement)***.**

4. **Identity of target pests** *(Client Record Worksheet will meet this requirement)***.**

5. **Pest control and management/method** *(Client Record will meet this requirement)***.**

   (a) Method of control selected.
   (b) Management method or pesticide name.
   (c) Rates, product, and form.
   - Timing of application
   - Method of application

   (d) Location of sensitive resources and setbacks
   (e) Mitigation and management techniques.

6. **Evaluate environmental impact of the pesticide management** (WIN-PST and Pest Management Worksheet will meet this requirement).

   ► Environmental risks will be determined by using NRCS' Windows Pesticide Screening Tool (WIN-PST) in Tennessee.
   ► Select management techniques and conservation practices to mitigate for **Intermediate and High Hazardous fish and human ratings.**
   ► **Client's Acknowledgment Statement and Certification** of practice implementation signed at **top of Pest Management Worksheet**.

7. **Operation, Safety, and Maintenance Plan** (TN 595 Job Sheet will meet this requirement.)

OPERATION, SAFETY, AND MAINTENANCE

The pest management component of a conservation plan shall include the following operation and maintenance items:

A safety plan complete with telephone numbers and addresses for emergency treatment centers for individuals exposed to chemicals and the telephone number for the nearest poison control center. The National Pesticide Information Center (NPIC) telephone number in Corvallis, Oregon, may also be given for non-emergency information: **1-800-858-7378** Monday-Friday 6:30 a.m. to 4:30 p.m. Pacific Time.

For advice and assistance with emergency spills that involve agrichemicals, the local

emergency telephone number should be provided. The national 24-hour CHEMTREC telephone number may also be given: **1-800-424-9300**

Minimize exposure to chemicals, wear proper protective clothing, and use safety equipment as appropriate.

Pesticide users must read and follow label directions, maintain appropriate Material Safety Data Sheets (MSDS), and become certified to apply restricted use pesticides.

Post signs according to label directions or State and Federal laws around fields that have been treated. Follow the established re-entry time as stated on the MSDS.

Livestock (cattle, sheep, swine, and horses) are often killed from consumption of pesticide granules, wettable powders, and dusts accidentally spilled on the ground or left unattended. Precaution concerning re-entry time for grazing and hay cutting should be taken.

Properly locate chemical mixing and equipment rinsing stations to minimize contamination from spills. Provide for managing accidental spills. (See UTAES *FARM*A*SYST Pesticide Worksheet* and *Fact Sheet*.)

Properly triple rinse equipment and re-use rinsate for subsequent batches of the same pesticide, where possible.

Store pesticides in original containers in a locked, well ventilated, weather resistant building. Post warning signs on or around the building. Dispose of pesticide containers according to label directions, and adhere to local or State regulations. For pesticide waste collection sites, see the Tennessee Department of Agriculture web site.

Recognize the dangers from excessive exposure and take appropriate precautionary measures. This is especially important for farm workers who spend long hours in the field.

Maintain mechanical equipment in good working condition and calibrate application equipment to ensure recommended rates are applied. Replace worn components of pesticide application equipment as well as other pest management implements.

SPRAY DRIFT

Spray drift can reduce weed control, damage to non-target species, and pose environmental and health threats. There are two types of drift, physical and vapor. Physical is the movement of liquid droplets, which is influenced by wind and sprayer setup (pressure). Vapor drift is less obvious, but as hazardous. Vapor drift is influenced by air temperature and volatilization potential of the compound.

Spray drift reduction considerations:

- Calibrate sprayer for low pressure, when possible. (Effectiveness may be reduced for some chemicals, such as fungicides.) High volume (20 to 39 gallons per acre) low pressure, 20 psi or less will reduce the number of small spray droplets. Very fine droplets measuring less than 100 microns (e.g., human hair) remain in the air stream longer. Fine and medium spray droplets measuring between 120 microns and 350 microns deposit efficiently (e.g., thread 150 microns and toothbrush bristle 300 microns). (For further guidance, see UTAES *Weed Control Manual*.)

- Calibration is determined by :
  - Ground or Air Speed of Application Equipment
  - Nozzle Size
  - Nozzle Condition (e.g., clogs and wear)
  - Number of Nozzles
  - Amount of Pressure Placed on the Spray Mix
  - Surface Area of Crop Canopy

- Avoid spraying on windy days. Calm conditions are typically early or late in the day.

- Spraying distance to crop should be minimized maintaining pattern uniformity.

- Spray at the time of the year when sensitive crops are not growing (e.g., tomatoes, tobacco, cotton).

- Under warm conditions, if possible, choose chemical with lower volatilization rates. Physical drift reductions, such as low pressure, do not affect vapor drift.

- Read label. Many pesticides have recommendations for drift reduction.

REFERENCES AND RESOURCES

Environmental Protection Agency. Biological Control Fact Sheets and Resources. http://www.epa.gov/pesticides/biopesticides/

Environmental Protection Agency, Office of Pesticide Programs. http://www.epa.gov/pesticides/.

Environmental Protection Agency, Office of Pesticide Programs. **http://www.epa.gov/opp00001/regulating/fifra.pdf**

USDA, Office of Pest Management Policy and Pesticide Impact Assessment Program. http://state.tn.us/agriculture/regulate/aip/certlic.html

USDA-Agricultural Research Service. Pesticide Properties Database. http://www.ars.usda.gov/Services/docs.htm?docid=14199

USDA. Weed Resistance and Prospective Alternatives. **http://www.weedscience.org/in.asp**

USDA NRCS Tennessee Pest Management Job Sheet.

USDA NRCS Policy, *General Manual* 190, Ecological Sciences, Part 404, Pesticides. March 2001.

USDA NRCS "Windows Pesticide Screening Tools Computer Program (WIN-PST)." http://www.wsi.nrcs.usda.gov/products/W2Q/pest/winpst.html

USDA NRCS National Agricultural Pesticide Risk Analysis (NAPRA). **http://www.wsi.nrcs.usda.gov/products/W2Q/pest/napra.html**

University of Tennessee Agricultural Extension Service (UTAES). *Tennessee FARM*A*SYST and HOME*A*SYST,* SP-484B. http://economics.ag.utk.edu/fasfact.html

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All of the following publications can be retrieved from The University of Tennessee Agricultural Extension Service web site:
http://www.utextension.utk.edu/publications/pests/default.asp#pesticide

Field Crop Pests Publications
Cotton Insect Control (PB-387).
Tobacco Pest Control (SP-91).
http://weeds.utk.edu/

UTAES *Weed Control Manual for Tennessee PB-1580.* UTAES Certification and Licensing Material: *Applying Pesticides Correctly.*

NRCS, TN
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